

CLAIMS

1. A card-type electronic apparatus comprising:
a printed circuit board assembly (PCBA);
an upper cover comprising a plurality of upper sidewalls extending substantially perpendicularly from a top exterior surface of the upper cover, each of the plurality of upper sidewalls including an upper mating feature; and
a lower cover comprising a plurality of lower mating features and at least two lower sidewalls, the at least two lower sidewalls extending substantially perpendicularly from a bottom exterior surface of the lower cover, the plurality of lower mating features being inboard of the at least two lower sidewalls,
wherein the plurality of upper mating features are joined to the plurality of lower mating features, and
wherein the upper cover and the lower cover enclose the PCBA.
2. The card-type electronic apparatus of Claim 1, wherein the at least two lower sidewalls completely surround the upper cover.
3. The card-type electronic apparatus of Claim 1, wherein the at least two lower sidewalls partially surround the upper cover.
4. The card-type electronic apparatus of Claim 1, wherein the at least two lower sidewalls form a slip fit with the upper cover.

5. The card-type electronic apparatus of Claim 1, wherein the at least two lower sidewalls form an interference fit with the upper cover.

6. The card-type electronic apparatus of Claim 1, wherein the plurality of upper mating features include tongue elements, and

wherein the plurality of lower mating features includes groove elements sized to accept the tongue elements.

7. The card-type electronic apparatus of Claim 1, wherein the plurality of upper mating features includes at least one stair-step feature, and

wherein the at least one stair-step feature is attached to one of the plurality of lower mating features.

8. The card-type electronic apparatus of Claim 1, wherein the plurality of upper mating features includes a first inclined surface, the first inclined surface sloping away from the upper cover, and

wherein the plurality of lower mating features includes a second inclined surface, the second inclined surface sloping towards the lower cover, and the second inclined surface being attached to the first inclined surface.

9. The card-type electronic apparatus of Claim 1, wherein the PCBA comprises a one or more integrated circuits (ICs) mounted on a PCB, and

wherein the lower cover comprises one or more support structures, the one or more support structures being in contact with one or more unpopulated regions on the PCB.

10. The card-type electronic apparatus of Claim 1, wherein each of the at least two lower sidewalls includes a top surface, and

wherein an upper external surface of the upper cover is above a plane defined by the top surfaces of each of the at least two lower sidewalls.

11. The card-type electronic apparatus of Claim 1, wherein each of the at least two lower sidewalls includes a top surface, and

wherein an upper external surface of the upper cover is at or below a plane defined by the top surfaces of each of the at least two lower sidewalls.

12. The card-type electronic apparatus of Claim 1, wherein the card-type electronic apparatus comprises one of a Secure Digital (SD) card, a CompactFlash (CF) card, a Memory Stick card, a USB flash drive, an ExpressCard, and a flash memory hard drive.

13. The card-type electronic apparatus of Claim 1, further comprising a switch protruding through one of the at least two lower sidewalls.

14. The card-type electronic apparatus of Claim 1, wherein at least one of the at least two lower sidewalls includes a notch.

15. A method for assembling a card-type electronic apparatus, the method comprising enclosing a printed circuit board assembly (PCBA) between an upper cover and a lower cover, wherein enclosing the PCBA comprises:

placing ultrasonic bonders attached to the upper cover in contact with mating features in the lower cover, wherein the mating features are inboard of a plurality of lower sidewalls extending substantially perpendicularly from a bottom exterior surface of the lower cover;

applying a clamping load and ultrasonic vibrations to the upper cover and the lower cover.

16. The method of Claim 15, wherein placing the ultrasonic bonders in contact with the mating features comprises inserting the upper cover into a pocket defined by the plurality of lower sidewalls.

17. The method of Claim 16, wherein the plurality of lower sidewalls completely surround the mating features in the lower cover, and

wherein inserting the upper cover into the pocket comprises positioning the upper cover above the lower cover and moving the upper cover into the lower cover in a direction substantially perpendicular to the bottom external surface of the lower cover.

18. The method of Claim 16, wherein the plurality of lower sidewalls partially surround the mating features in the lower cover, and

wherein inserting the upper cover into the pocket comprises positioning the upper cover beside the lower cover and sliding the upper cover into the pocket in a direction substantially parallel to the bottom exterior surface of the lower cover.

19. The method of Claim 16, further comprising mounting the PCBA in the upper cover before placing the ultrasonic bonders contact with the mating features.

20. A card-type electronic apparatus comprising:
a printed circuit board assembly (PCBA);
an upper cover; and
a lower cover, the lower cover comprising a plurality of lower sidewalls extending substantially perpendicularly from a bottom exterior surface of the lower cover, the plurality of lower sidewalls defining a pocket,
wherein the upper cover is attached to the lower cover at a seam within the pocket,
wherein the upper cover and the lower cover enclose the PCBA.

21. The card-type electronic apparatus of Claim 20, wherein the plurality of lower sidewalls completely surround the upper cover.

22. The card-type electronic apparatus of Claim 20, wherein the plurality of lower sidewalls partially surround the upper cover.

23. The card-type electronic apparatus of Claim 20, wherein the lower cover includes a plurality of support structures within the pocket, the plurality of support structures being in contact with unpopulated regions of the PCBA.

24. The card-type electronic apparatus of Claim 20, wherein the upper cover comprises a plurality of upper sidewalls extending substantially perpendicularly from an upper exterior surface of the upper cover, and

wherein the plurality of upper sidewalls are positioned within the pocket.

25. The card-type electronic apparatus of Claim 24, wherein the plurality of upper sidewalls includes a plurality of tongue features, each of the plurality of tongue features mating with one of a plurality of groove features in the lower cover.

26. The card-type electronic apparatus of Claim 24, wherein each of the plurality of upper sidewalls includes a step feature, each of the step features being joined to the lower cover within the pocket.

27. The card-type electronic apparatus of Claim 24, wherein the plurality of upper sidewalls includes at least one upper inclined surface, the at least one upper inclined surface sloping away from the upper cover,

wherein the plurality of lower sidewalls includes at least one lower inclined surface, the at least one lower inclined surface sloping towards the lower cover, and

wherein the at least one upper inclined surface is attached to the at least one lower inclined surface within the pocket.

28. The card-type electronic apparatus of Claim 24, wherein each of the plurality of lower sidewalls has a top, and

wherein the upper exterior surface of the upper cover is above a plane defined by the tops of the plurality of lower sidewalls.

29. The card-type electronic apparatus of Claim 24, wherein each of the plurality of lower sidewalls has a top, and

wherein the upper exterior surface of the upper cover is at or below a plane defined by the tops of the plurality of lower sidewalls.

30. The card-type electronic apparatus of Claim 20, wherein the card-type electronic apparatus comprises one of a Secure Digital (SD) card, a CompactFlash (CF) card, a Memory Stick card, a USB flash drive, and a flash memory hard drive.

31. The card-type electronic apparatus of Claim 20, further comprising a switch protruding through one of the plurality of lower sidewalls.

32. The card-type electronic apparatus of Claim 20, wherein at least one of the plurality of lower sidewalls includes a notch.